# HANDOUT #1

## Draft Rationale for Determining the Capacity of Isolated Conveyance

This document describes the rationale for determining that 15,000 cfs is the appropriate conveyance capacity for the isolated canal. This determination was based on multiple factors that are discussed in detail below. It is important to note that the recommended capacity of the canal matches the existing combined physical pumping capacity of the Banks and Jones pumping plants and conveyance capacity in California Aqueduct and Delta Mendota Canal. Therefore, concerns regarding the creation of additional export capacity from the Delta are unwarranted.

Operational flexibility was a primary factor used in determining the capacity of the canal. A capacity of 15,000 cfs would allow diversion at sufficient rates to accommodate the highly variable inter- and intra-annual hydrology of the Sacramento and San Joaquin River watersheds. This north Delta diversion capacity would allow for a "big gulp/small sip" operation in which water would be diverted from the north Delta facility at a higher rate when there is sufficient water in the Sacramento River and water would be diverted at a lower rate or not at all when there are insufficient flows in the river. Operations of a north Delta facility of this size would allow for meeting both water supply demands and protection of covered fish species. Diversion rates could be dependent on the time of year with respect to fish attraction flows and presence near the facilities. Diversion rates could be relatively lower during times of the year when fish depend on higher flows or are predicted to be in the vicinity of the intakes (e.g., spring), whereas diversion rates could be relatively higher in times of the year when fish are least likely to be in the vicinity of the intakes and are less dependent on flows as cues for their life history (e.g., summer). This operational approach would also allow variability in river hydrology to be more similar to historical conditions and eliminate removing the peaks and troughs of the hydrograph, as currently occurs. To allow the highly variable and flexible nature of this operational approach, a canal of at least 15,000 cfs is needed.

At a smaller temporal scale, sizing the canal at 15,000 cfs could provide for improved water supply reliability and the protection for covered fish species through variable operations with tidal flows. Positive barrier fish screens rely on sufficient flows to be efficient at avoiding impingement of fish on the screens. The sweeping velocity past the screen must exceed the approach velocity to the screen by 2-3 times for maximum fish protection. Due to tidal action on the Sacramento River, this criterion would not be met at lower flows. With greater capacity, diversions could take advantage of ebb tides when the sweeping to approach velocity ratio is sufficient, decrease when the ratio is insufficient, and cease diversions during flood tides.

Although preliminary CalSim and Cal-Lite modeling indicates that use of the full capacity of a 15,000 cfs canal would be infrequent, these results were based on monthly averages and fail to show daily and hourly flexibility in which the full capacity may be used during short periods to achieve planning goals.

There is concern that north Delta diversions may degrade agricultural and municipal water quality in the south Delta because less Sacramento River water would be conveyed through the Delta to the south Delta facilities. Preliminary CalSim/Cal-Lite modeling results, however, indicate that dual operations of north and south Delta diversions can meet existing water quality standards over which SWP and CVP project operations in the Delta have control.

Predicted future climate change suggests that a larger canal is needed to maintain water supply reliability. Future climate change is expected to result in increased variability of Delta hydrology. A 15,000 cfs canal would provide the operational flexibility to accommodate this increase in variability. Future climate change is also expected to result in sea level rise. With sea level rise, dual conveyance would depend more greatly on the north Delta facility as water quality conditions degrade at south Delta facilities.

A 15,000 cfs capacity of a canal could prevent the loss of water supplies in the face of catastrophic events, such as the failure of a number of levees protecting deeply subsided islands.

In an initial DWR analysis, a canal larger than 15,000 cfs would need to import soil to build sufficient levees for the canal, significantly increasing construction costs of the canal. A canal smaller than 15,000 cfs would require the export of soil associated with digging the canal, also significantly increasing construction costs. However, a 15,000 cfs canal would be able to use the soil removed for digging the canal for building the levees.

There is an important trade-off between the use of a new north Delta diversion facility and existing south Delta facilities. When the ability to divert from the north Delta facilities is insufficient, diversions from the south Delta would supplement those from the north Delta facility. There are concerns related to BDCP covered species associated with operation of the south Delta facilities. Model runs were done using a canal smaller that 15,000 cfs (5,000 and 10,000 cfs) and meeting existing export needs of the CVP and SWP. The result was pumping from the southern Delta which raised these same concerns. At a pumping capacity of 15,000 cfs for a north Delta diversion facility, the southern Delta pumping concerns were minimized. This dual conveyance configuration with a 15,000 cfs capacity at the northern Delta appears to be the most optimal mix of north Delta pumping as a way to minimize pumping from the southern Delta and the conflicts such pumping has caused in the past.

The anticipated state of the art fish screens and operational approach at the north Delta facility are expected to greatly reduce the effects on covered fish species. As a result, operation of the north Delta facility should be much more beneficial to fish than operation of the south Delta facilities. A 15,000 cfs canal capacity would establish the north Delta diversion facility as the primary point of diversion and would reduce the effects of the south Delta diversion facility associated with Old and Middle River flows and QWEST.